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First Named Inventor	Griffiths et al.
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Examiner Name	A. Jackson
Attorney Docket Number	1160-3912.1US
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ENCLOSURES *(check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment / Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR1.52 or 1.53
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- ☐ Appeal Communication to Board of Appeals and Interferences
- ☒ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
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Remarks

The Commissioner is authorized to charge any additional fees required but not submitted with any document or request requiring fee payment under 37 C.F.R. §§ 1.16 AND 1.17 TO Deposit Account 20-1469 during pendency of this application.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

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Signature			
Printed Name	Joseph A. Walkowski		
Date	January 30, 2006	Reg. No.	28,765

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Griffiths et al.

Serial No.: 09/889,705

Filed: September 19, 2001

For: METHOD AND APPARATUS FOR DETECTION OF FLUID LEVEL IN A CONTAINER

Confirmation No.: 7403

Examiner: A. Jackson

Group Art Unit: 2856

Attorney Docket No.: 1160-3912.1US

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APPEAL BRIEF

Mail Stop Appeal Brief – Patent
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sirs:

This brief is submitted in the format required under 37 C.F.R. § 41.37(c). A check in the amount of $250.00 for the fee under 37 C.F.R. § 41.20(b)(2) for filing a brief in support of an appeal is enclosed, Appellants being qualified for small entity status.

1) REAL PARTY IN INTEREST

The real party in interest in the present pending appeal is Rocky Mountain Research, Inc.,

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Assignee of the pending application as recorded with the United States Patent and Trademark Office on July 16, 2002, at Reel 013088, Frame 0960.

2) RELATED APPEALS AND INTERFERENCES

The Appellants, the Appellants' representative, and the Assignee are not aware of any pending appeal or interference that would relate to, directly affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

3) STATUS OF THE CLAIMS

Claims 1 through 14, and 16 through 29 are pending in the application.

Claim 15 is canceled.

Claims 1 through 14, and 16 through 29 stand rejected.

No claims are allowed.

Claims 1 through 14, and 16 through 29 are the subject of the pending appeal.

4) STATUS OF AMENDMENTS

No amendments have been proposed in the present application subsequent to the Final Rejection mailed July 28, 2005.

5) SUMMARY OF THE CLAIMED SUBJECT MATTER

In this section, all references are to the substitute specification filed with the Office on January 22, 2002.

The presently claimed invention is directed to a method and apparatus for sensing when a fluid level of a viscous fluid reaches a level within a container. Substitute specification, paragraph [0002].

The claimed apparatus comprises a capacitance-type fluid level sensor for sensing fluid level of a viscous fluid in a container. *Id.* at paragraphs [0002], [0012] The sensor includes mutually cooperative, mutually electrically isolated first, upper electrode 22 and second, lower electrode 24 arranged for placement on the wall of a container in isolation (such as on a thin,

electrically insulative film 20) from the interior volume of the container. *Id.* at paragraphs [0013], [0028], FIG. 2. Each of the first and second electrodes exhibits a two-dimensional area having a vertical dimension and a horizontal dimension. *Id.* at paragraphs [0013], [0028], [0032], FIG. 2 The two electrodes 22, 24 are arranged in mutual proximity such that at least a majority of their respective areas are both vertically and horizontally offset from each other. *Id.* at paragraphs [0015], [0028], [0029], FIG. 2 *See also* original claims 1 and 5 The vertical and horizontal offset is to an extent at least sufficient to enable rapid detection of a decreasing level of the viscous fluid in the container when the viscous fluid has reached a level proximate a lower edge of the first, upper electrode and a residual film of the viscous fluid remains on an inner surface of the wall of the container above the level of the viscous fluid and adjacent at least a portion of the first, upper electrode. *Id.* at paragraphs [0011], [0012], [0015], [0030]

The claimed method comprises a method for detecting a level of a fluid within a container having an interior volume. *Id.* at paragraph [0002] In the claimed method, a capacitive structure 6 including mutually cooperative, mutually electrically isolated, first and second electrodes 22, 24 are placed on a wall of the container in isolation (such as on a thin, electrically insulative film 20) from the fluid volume of the container *Id.* at paragraphs [0025], [0028], FIG. 2 Each electrode exhibits a two-dimensional area having a vertical dimension and a horizontal dimension and the two electrodes are arranged in mutual proximity such that at least a majority of each of their respective areas are both vertically and horizontally offset from each other. *Id.* at paragraphs [0015], [0028], [0029], FIG. 2 The capacitive structure is driven with an oscillating signal at a frequency of more than about 1 MHz. and an output signal is generated from the capacitive structure *Id.* at paragraphs [0014], [0017], [0033], FIG. 3 The fluid level within the container is decreased and a change is the output signal responsive to the change in the fluid level is detected. *Id.* at paragraph [0014], [0033] *See also* original claim 21

6) <u>GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL</u>

A. Claims rejected under 35 U.S.C. 112, first paragraph

A.1 Claims 21-29 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

B. Claims rejected under 35 U.S.C. 103(a)

B.1 Claims 1-6, 13, 14, 16, 17 and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Larson (U.S. Patent 4,389,889) in view of Cohen et al. (U.S. Patent 5,135,485).

B.2 Claims 7, 8 and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Larson (U.S. Patent 4,389,889) in view of Cohen et al. (U.S. Patent 5,135,485) and further in view of. Larson (U.S. Patent 4,201,085).

B.3 Claims 9-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Larson (U.S. Patent 4,389,889) in view of Cohen et al. (U.S. Patent 5,135,485) and further in view of. Hannan et al. (U.S. Patent 5,406,843).

B.4 Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Larson (U.S. Patent 4,389,889) in view of Cohen et al. (U.S. Patent 5,135,485) and further in view of. Jackson (U.S. Patent 3,939,360).

B.5 Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Larson (U.S. Patent 4,389,889) in view of Cohen et al. (U.S. Patent 5,135,485) and Jackson (U.S. Patent 3,939,360) and further in view of Paglione (U.S. Patent 5,051,921).

B.6 Claims 21-29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Larson (U.S. Patent 4,389,889) in view of Hannan et al. (U.S. Patent 5,406,843) and further in view of. Cohen at al. (U.S. Patent 5,135,485).

7) <u>ARGUMENT</u>

A CLAIMS REJECTED UNDER 35 U.S.C. 112, FIRST PARAGRAPH

A.1 PATENTABILITY OF CLAIMS 21-29

In an Office Action mailed July 28, 2005, and made Final (hereinafter "the Final Action"), the Examiner rejected claims 21-29 as being unpatentable under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

35 U.S.C. 112, first paragraph, states:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which

> it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out the invention.

The Office has asserted "Regarding claims 21-29, Applicants have amended the claims to include the limitation of 'decreasing a fluid level within a fluid level…'(sic). There is no disclosure as to what and how this decreasing is done. Applicants have not disclosed where this limitation is found within the specification."

Appellants actually amended claim 21, *inter alia,* to recite "decreasing a fluid level within the container at a rate sufficient to leave a residual film of the viscous fluid on an interior surface of the wall above the level of the viscous fluid. . . ." Appellants note the discussion of the use of blood in open heart surgery, stating "It is critical to monitor the fluid (blood) level in such containers in a manner which provides an accurate and timely signal <u>as to when blood in the container has been reduced below a certain level</u>. While capacitance-type level sensors have been employed in an attempt to measure such blood levels, <u>the viscous nature of blood leaves a film on the interior walls of the container</u>, giving a false level indication." (emphasis added) Substitute specification filed January 22, 2022 at paragraph [0011]. *See also Id.* at paragraphs [0012], [0017], [0019], [0029], [0031] for examples of references to reducing a fluid level, and specifically a level of a viscous fluid, within a container.

Further, if the Examiner is asserting that one of ordinary skill in the relevant art would not know how to decrease a fluid level within a container, Appellants respectfully traverse this position as untenable and without support.

B. CLAIMS REJECTED UNDER 35 U.S.C. 103(a)

<u>Authorities Relied Upon</u>

Rejection of claims under 35 U.S.C. § 103(a) requires that the U.S. Patent and Trademark Office (the "Office") establish a *prima facie* case of obviousness. M.P.E.P. § 2142. M.P.E.P. 706.02(j) sets forth the standard for an obviousness rejection:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must

> be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

B.1 PATENTABILITY OF CLAIMS 1-6, 13, 14, 16, 17 and 20

Claims 1-6, 13, 14, 16, 17 and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Larson (U.S. Patent 4,389,889, hereinafter "Larson '889") in view of Cohen et al. (U.S. Patent 5,135,485, hereinafter "Cohen"). Applicants respectfully traverse this rejection, as hereinafter set forth.

B.1(a) Claims 1, 5, 6 and 13

Claim 1, as amended herein, clearly patentably defines over the asserted combination of references. Claim 1 recites "A capacitive sensor for detecting a level of a viscous fluid in a container having an interior volume, the sensor comprising mutually cooperative, mutually electrically isolated first, upper and second, lower electrodes arranged for placement on a wall of the container in isolation from the interior volume of the container, wherein each of the first and second electrodes exhibits a two-dimensional area having a vertical dimension and a horizontal dimension, and wherein the first and second electrodes are arranged in mutual proximity such that at least a majority of each of their respective areas are both vertically and horizontally offset from each other . . ." Thus, the sensor for detecting the level of a viscous fluid must comprise "mutually cooperative, mutually electrically isolated first, upper and second, lower electrodes."

The Larson '889 reference is directed to the detection of water in the bottom of a tank for holding a petrochemical fuel, such as diesel fuel or gasoline. Applicants note that the plate 20 placed at (FIG. 2) or near (FIG. 1) the bottom of a tank 11 cooperates with plate 12 to detect the <u>presence of water</u>, due to the much greater dielectric constant thereof in comparison to diesel or gasoline. As noted in the specification of the Larson '889 reference, Column3, lines 18 to 24 and Column3, line 67 to Column4, line 4, plates 12-14, which completely overlap vertically, are used to detect the <u>level of liquid</u> in the tank. As referenced in Larson '889, this is the technique disclosed in the Larson U.S. Patent 4,201,085. Further, Appellants have more specifically defined

the spatial relationship of their first and second sensor electrodes in the context of measurement of a decreasing level of a viscous fluid within a container on which the sensor is placed. There is no description in the reference of any such relationship with respect to any of plates 12-14 and 20.

Further, it is noted that claim 1 recites the presence of "mutually electrically isolated first, upper and second, lower electrodes arranged for placement on a wall of the container in isolation from the interior volume of the container," while FIG. 2 of Larson '889 as relied upon by the Examiner places plate 20 on the bottom of tank 11.

The Examiner admits that Larson '889 does not disclose rapid detection of a decreasing level of the (sic) viscous fluid in the container when the viscous fluid has reached a level proximate lower edge of the first, upper electrode and a residual film of the viscous fluid remains on an inner surface of the wall of the container above the level of the viscous fluid and adjacent at least a portion of the first, upper electrode.

The Cohen reference is relied upon by the Examiner to supply the admitted deficiencies in Larson '889. However, the portions of Cohen (Abstract, Figures 1, 2, 3, 4, 6, 7, Column 1, lines 20-22, Column 2, lines 39-66, Column 8, lines 1-10, Column 10, lines 66-68) do not support this assertion. Cohen merely mentions that "[S]terile i.v. bags are normally used to dispense plasma, whole blood, replacement electrolyte, etc." at Column 1, lines 20-22. There is no specific mention whatsoever of level sensing of any viscous fluid throughout the remainder of Cohen, or of sensing the level of any fluid wherein a residual film remains on the inner wall of the container holding same as the fluid level is decreased. Further, there is no recognition of the problems in fluid level measurement that such a residual film may cause. Finally, there is no enabling disclosure in Cohen, regardless of the structure employed, to effect fluid level measurement under the conditions set forth in the claim.

Thus, the Examiner's assertion that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Larson to include a measurement of rapid detection of a decreasing level of the viscous fluid in the container when the viscous fluid has reached a level proximate lower edge of the first, upper electrode and a residual film of the viscous fluid remains on an inner surface of the wall of the container above

the level of the viscous fluid and adjacent at least a portion of the first, upper electrode" is clearly in error. More specifically, Larson '889 teaches, in pertinent part and using the structure relied upon, detection of the presence (not level) of water (a non-viscous fluid) in a tank using one electrode (12) on the side of a tank and the other (20) on the bottom, referencing FIG. 2. Cohen merely describes a number of capacitive structures for measuring fluid level in a medical environment wherein the fluid level may be increasing or decreasing. No disclosure of a structure enabling rapid detection of a decreasing level of a viscous fluid leaving a residual film on the inside of a container is present in Cohen. Moreover, there is no motivation to combine the two references, since one is directed to fuel level measurement and (in pertinent part) the presence of water in the bottom of a fuel tank, while the other is directed to liquid level measurement in a medical environment. In addition, there is no reasonable expectation of success by combining Cohen with Larson '889 because the relied-upon structure of Larson '889 is not even used for liquid level measurement. Finally, the two references, in combination, do not teach or suggest the claimed capacitive sensor structure of "wherein the first and second electrodes are arranged in mutual proximity such that at least a majority of each of their respective areas are both vertically and horizontally offset from each other and to an extent at least sufficient to enable rapid detection of a decreasing level of the viscous fluid in the container when the viscous fluid has reached a level proximate a lower edge of the first, upper electrode and a residual film of the viscous fluid remains on an inner surface of the wall of the container above the level of the viscous fluid and adjacent at least a portion of the first, upper electrode."

Claims 5, 6 and 13 are allowable as depending from claim 1.

B.1(b) Claims 2, 3, 4 and 14

Claims 2, 3, 4, and 14 are each further allowable as the electrode structure relied upon by the Examiner in '889 is not part of a capacitive sensor for measuring liquid level in a container but, rather, the presence of a specific, unwanted, non-viscous fluid (water).

B.1(c) Claim 16

Claim 16 is further allowable as the electrodes 12, 20 depicted in FIG. 2 do not meet the claim limitation of being placed on the wall of a container. Electrode 20 is placed on the bottom of tank 11.

B.1(d) Claim 17

Claim 17 is further allowable, as the Examiner admits that Larson '889 fails to disclose a mounting structure but does not provide any additional information in support of the rejection.

B.1(e) Claim 20

Claim 20 is further allowable because, contrary to the Examiner's position, there is no motivation to combine the disclosure of Cohen wherein electrodes are placed within the wall of a container used in a medical environment to modify the structure of Larson '889, used for detecting the presence of water in a fuel tank.

B.2 PATENTABILITY OF CLAIMS 7, 8 AND 12

Claims 7, 8 and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Larson (U.S. Patent 4,389,889) in view of Cohen et al. (U.S. Patent 5,135,485) and further in view of. Larson (U.S. Patent 4,201,085, hereinafter "Larson '085"). Appellants traverse this rejection as hereinafter set forth.

Claims 7, 8 and 12 are allowable as Larson '085 fails to cure the deficiencies in the combined teachings of Larson '889 and Cohen with respect to Claim 1.

B.3 PATENTABILITY OF CLAIMS 9-11

Claims 9-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Larson (U.S. Patent 4,389,889) in view of Cohen et al. (U.S. Patent 5,135,485) and further in view of. Hannan et al. (U.S. Patent 5,406,843, hereinafter "Hannan"). Appellants respectfully traverse this rejection as hereinafter set forth.

Claims 9 through 11 are allowable as depending from claim 1.

Claim 9 recites the presence of control circuitry coupled to one of the first and second electrodes and configured to supply an oscillating signal having a frequency greater than 1 MHz thereo, another of the first and second electrodes being coupled to a reference voltage. Claim 10 requires that the frequency be at least about 4 MHz. Claim 11 requires that the frequency be at least about 8 MHz.

It appears that the Examiner has misinterpreted Hannan. Specifically, Column. 9, lines

63-66 of Hannan discloses providing a *timing* or clock signal of about 2-8 MHz to controller 16 to time its operation which, as noted at Column 7, lines 7-37, cited by the Examiner, consists of "short duration DC pulses" and *not* an oscillating signal. There is no teaching that the *output* of controller 16 as an *input* to the electrodes is within a 2-8 MHz range. In fact, Hannan et al. is silent on the issue as to what the drive frequency may be. The Column 5 and Column 7 citations referenced by the Examiner do not support the providing of an *oscillating input signal* as required by each of claims 9, 10 and 11, each require providing an oscillating signal to one of the first and second electrodes. Thus, in addition to not remedying the deficiencies of Larson '889 in combination with Cohen with respect to claim 1, Hannan does not, in fact, provide a teaching or suggestion of the limitations respectively set forth in each of claims 9,10 and 11.

The Examiner has asserted Final Action that it is well known in the art to use one type of signal (DC pulses) in place of the other (oscillating signals), citing two U.S. Patents (Kelly 6,018,247 and Matzuk ,which remains unidentified by number). Assuming *arguendo* but without conceding the accuracy thereof that this assertion is correct, the claimed frequency of the controller output in any of claims 9, 10 and 11 as an input to one of the electrodes still remains untaught and unsuggested. Further, as Hannan is directed to liquid level measurement for automotive applications (Column 1, line 55 through Column 2, line 56) there is no motivation to combine its teachings with those of Larson '889 (liquid level measurement in fuel tanks) and Cohen (fluid level measurement in a medical environment). Further, even assuming *arguendo* without conceding the accuracy thereof that Hannan does teach use of a controller output in a 2-8 MHz frequency range as an electrode input, there is no motivation or suggestion in the record, absent Appellants' own disclosure, to select an input frequency within such a range in Larson '889, Cohen or a combination thereof or provide a reasonable expectation of success of such combination in the measurement of a viscous fluid which leaves a residual film on the wall of its container as the level thereof decreases.

B.4 CLAIM 18

Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Larson (U.S. Patent 4,389,889) in view of Cohen et al. (U.S. Patent 5,135,485) and further in view of.

Jackson (U.S. Patent 3,939,360).

Claim 18 is allowable as Jackson fails to cure the deficiencies in Larson '889 and Cohen with respect to claim 1. Further, as noted above, the Examiner has failed to state a basis for the rejection of claim 17.

B.5 CLAIM 19

Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Larson (U.S. Patent 4,389,889) in view of Cohen et al. (U.S. Patent 5,135,485) and Jackson (U.S. Patent 3,939,360) and further in view of Paglione (U.S. Patent 5,051,921). Appellants respectfully traverse this rejection as hereinafter set forth

Claim 19 is allowable as Paglione fails to cure the deficiencies in Larson '889, Cohen and Jackson with respect to claim 1. Further, as noted above, the Examiner has failed to state a basis for the rejection of claim 17.

B.6 CLAIMS 21-29

Claims 21-29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Larson (U.S. Patent 4,389,889) in view of Hannan et al. (U.S. Patent 5,406,843) and further in view of. Cohen at al. (U.S. Patent 5,135,485). Applicants respectfully traverse this rejection, as hereinafter set forth.

Claim 21, as amended herein, is allowable for reasons similar to that advanced above with respect to claim 1. It is noted that Larson, Cohen et al. and Hannan et al., in combination, fail to teach or suggest the method of claim 21 as now recited. Further, as noted above, there is no teaching in Hannan et al. of <u>driving</u> the capacitive structure at a frequency of more than about 1 MHz. Further, there is no motivation or suggestion, absent Applicants' own specification, of combining the Larson and Hannon et al. references nor would there be, absent reliance upon Applicants' own specification, any reasonable expectation of success of such a combination.

Claims 22 through 29 are allowable for the same reasons as set forth below with respect to claim 21.

Claim 21 recites a method for detecting a level of a viscous fluid within a container having an interior volume. The claim further requires "placing a capacitive structure including mutually cooperative, mutually electrically isolated, first, upper, and second, lower electrodes on a wall of the container in isolation from the interior volume of the container, wherein each electrode exhibits a two-dimensional area having a vertical dimension and a horizontal dimension and wherein the first and second electrodes are arranged in mutually proximity such that at least a majority of each of their respective areas are both vertically and horizontally offset from each other; <u>driving</u> the capacitive structure with an <u>oscillating signal at a frequency of more than about 1 MHz</u> and generating an output signal from the capacitive structure responsive thereto; <u>decreasing a fluid level within the container at a rate sufficient to leave a residual film of the viscous fluid on an interior surface of the wall above the level of the viscous fluid and at least proximate a lower edge of the first, upper electrode; and rapidly detecting a change in the output signal responsive to the decreasing of the fluid level</u>." (emphasis added)

The Larson '889 reference is directed to the detection of water in the bottom of a tank for holding a petrochemical fuel, such as diesel fuel or gasoline. Applicants note that the plate 20 placed at (FIG. 2) or near (FIG. 1) the bottom of a tank 11 cooperates with plate 12 to detect the <u>presence of water</u>, due to the much greater dielectric constant thereof in comparison to diesel or gasoline. As noted in the specification of the Larson '889 reference, Column 3, lines 18 to 24 and Column 3, line 67 to Column 4, line 4, plates 12-14, which completely overlap vertically, are used to detect the <u>level of liquid</u> in the tank. As referenced in Larson '889, this is the technique disclosed in the Larson U.S. Patent 4,201,085. Further, Appellants have more specifically defined the spatial relationship of placement of their first and second sensor electrodes in the context of measurement of a decreasing level of a viscous fluid within a container on which the sensor is placed. There is no description in the Larson '889 reference of any such relationship with respect to any of plates 12-14 and 20.

Further, it is noted that claim 21 recites placement of "mutually electrically isolated first, upper and second, lower electrodes arranged on a <u>wall</u> of the container in isolation from the interior volume of the container," while FIG. 2 of Larson '889 as relied upon by the Examiner places plate 20 on the <u>bottom</u> of tank 11.

The Examiner relies upon Hannan for a teaching of driving a capacitive structure with an oscillating signal at a frequency of more than about 1 MHz which, admittedly, Larson '889 fails to teach. However, as noted above it appears that the Examiner has misinterpreted Hannan. Specifically, Column9, lines 63-66 of Hannan discloses providing a *timing* or clock signal of about 2-8 Mhz to controller 16 to time its operation which, as noted at Column 7, lines 7-37, cited by the Examiner, consists of "short duration DC pulses" and *not* an oscillating signal. There is no teaching that the *output* of controller 16 as an *input* to the electrodes is within a 2-8 Mhz range. In fact, Hannan et al. is silent on the issue as to what the drive frequency may be. The Column 5 and Column 7 citations referenced by the Examiner do not support the driving of a capacitive structure with an *oscillating signal* as required by claim 21. Thus, Hannan does not, in fact, provide a teaching or suggestion of the drive frequency limitation set forth in claim 21.

The Examiner has asserted in the Final Action that it is well known in the art to use one type of signal (DC pulses) in place of the other (oscillating signals), citing two U.S. Patents (Kelly 6,018,247 and Matzuk, which remains unidentified by number). Assuming *arguendo* but without conceding the accuracy thereof that this assertion is correct, the claimed frequency of the controller output in claim 21 as an input to a capacitive structure still remains untaught and unsuggested. Further, as Hannan is directed to liquid level measurement for automotive applications (Column 1, line 55 through Column 2, line 56) there is no motivation to combine its teachings with those of Larson '889 (liquid level measurement in fuel tanks) and Cohen (fluid level measurement in a medical environment). Further, even assuming *arguendo* without conceding the accuracy thereof that Hannan does teach use of a drive frequency in a 2-8 MHz frequency range, there is no motivation or suggestion in the record, absent Appellants' own disclosure, to select a drive frequency within such a range in Larson '889, Cohen or a combination thereof or to provide a reasonable expectation of success of such combination in the measurement of a viscous fluid which leaves a residual film on the wall of its container as the level thereof decreases.

The Cohen reference (Column 11, line 15) is relied upon by the Examiner to supply the admitted deficiencies in Larson '889 with respect to adjustment of a fluid level in a container. However, Cohen fails to teach or suggest "decreasing a fluid level within the container at a rate

sufficient to leave a residual film of the viscous fluid on an interior surface of the wall above the level of the viscous fluid and at least proximate a lower edge of the first, upper electrode; and rapidly detecting a change in the output signal responsive to the decreasing of the fluid level" as noted above with respect to Claim 1. However, Cohen merely mentions that "[S]terile i.v. bags are normally used to dispense plasma, whole blood, replacement electrolyte, etc." at Column 1, lines 20-22. There is no specific mention whatsoever of level sensing of any viscous fluid throughout the remainder of Cohen, or of sensing the level of any fluid wherein a residual film remains on the inner wall of the container holding same as the fluid level is decreased. Further, there is no recognition in Cohen of the problems in fluid level measurement that such a residual film may cause. Finally, there is no enabling disclosure in Cohen, regardless of the structure employed, to effect fluid level measurement under the conditions set forth in the claim.

Thus, the Examiner's assertion that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Larson to include a decreasing a fluid level within the container at a rate sufficient to leave a residual film of the viscous fluid on an interior surface of the wall above the level of the viscous fluid and at least proximate a lower edge of the first upper electrode; and rapidly detecting a change in the output signal responsive to the decreasing of the fluid level" is clearly in error. More specifically, Larson '889 teaches, in pertinent part and using the structure relied upon, detection of the presence (not level) of water (a non-viscous fluid) in a tank using one electrode (12) on the side of a tank and the other (20) on the bottom, referencing FIG. 2. Cohen merely describes a number of capacitive structures for measuring fluid level in a medical environment wherein the fluid level may be increasing or decreasing. No disclosure of rapidly detecting a decreasing level of a viscous fluid leaving a residual film on the inside of a container is present in Cohen. Moreover, there is no motivation to combine Larson '889 with Cohen, since one is directed to fuel level measurement and (in pertinent part) the presence of water in the bottom of a fuel tank, while the other is directed to liquid level measurement in a medical environment. In addition, there is no reasonable expectation of success by combining Cohen with Larson '889 because the relied-upon structure of Larson '889 is not even used for liquid level measurement. Finally, the three references, in combination, do not teach or suggest the claimed method of "decreasing a fluid level within the

container at a rate sufficient to leave a residual film of the viscous fluid on an interior surface of the wall above the level of the viscous fluid and at least proximate a lower edge of the first, upper electrode; and rapidly detecting a change in the output signal responsive to the decreasing of the fluid level."

8) CLAIMS APPENDIX

A copy of claims 1 through 14, and 16 through 29 is appended hereto as "Appendix A."

9) EVIDENCE APPENDIX

No evidence pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 was submitted during prosecution of the above-referenced patent application. Therefore, no such evidence has been relied upon by Appellants in this Appeal.

As required by 37 C.F.R. § 41.37(c)(1)(ix), the only "other evidence entered by the examiner and relied upon by appellant in the appeal" includes U.S. patent references of record herein. Since copies of these references are present in the record, no EVIDENCE APPENDIX is required and additional copies of these documents are not provided with this Appeal Brief.

10) RELATED PROCEEDINGS APPENDIX

No decision(s) have been rendered by a court or by the Board in any proceeding identified in Section 2 of the Appeal Brief. Therefore, no RELATED PROCEEDINGS APPENDIX is required.

CONCLUSION

Appellants respectfully submit that claims 1 through 14, and 16 through 29 are allowable over the cited references of record. Appellants respectfully request that the rejections of claims 21 through 29 under 35 U.S.C. 112, first paragraph and of claims 1 through 14, and 16 through 29 under 35 U.S.C. § 103(a) be reversed.

Respectfully submitted,

Joseph A. Walkowski
Registration No. 28,765
Attorney for Applicants
TRASKBRITT
P.O. Box 2550
Salt Lake City, Utah 84110-2550
Telephone: 801-532-1922

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APPENDIX A

Claims 1-14, and 16-29

U.S. Patent Application No. 09/889,705
Filed September 19, 2001

1. A capacitive sensor for detecting a level of a viscous fluid in a container having an interior volume, the sensor comprising mutually cooperative, mutually electrically isolated first, upper and second, lower electrodes arranged for placement on a wall of the container in isolation from the interior volume of the container, wherein each of the first and second electrodes exhibits a two-dimensional area having a vertical dimension and a horizontal dimension, and wherein the first and second electrodes are arranged in mutual proximity such that at least a majority of each of their respective areas are both vertically and horizontally offset from each other and to an extent at least sufficient to enable rapid detection of a decreasing level of the viscous fluid in the container when the viscous fluid has reached a level proximate a lower edge of the first, upper electrode and a residual film of the viscous fluid remains on an inner surface of the wall of the container above the level of the viscous fluid and adjacent at least a portion of the first, upper electrode.

2. The sensor of claim 1, wherein the first and second electrodes are arranged such that their respective areas are substantially both vertically and horizontally offset from each other.

3. The sensor of claim 1, wherein the first and second electrodes are arranged such that their respective areas are completely both vertically and horizontally offset from each other.

4. The sensor of claim 1, wherein the first and second electrodes are both vertically and horizontally spaced from each other.

5. The sensor of claim 1, wherein the electrodes comprise substantially two-dimensional plates.

6. The sensor of claim 1, further comprising a conductor coupled to each of the first and second electrodes.

7. The sensor of claim 6, wherein the conductors coupled to each of the first and second electrodes are also coupled to control circuitry.

8. The sensor of claim 7, wherein the conductors coupled to each of the first and second electrodes are coupled to the control circuitry through a Zero Insertion Force connector.

9. The sensor of claim 1, further comprising control circuitry, wherein the control circuitry is coupled to one of the first and second electrodes and configured to supply an oscillating signal having a frequency greater than 1 MHz thereto, another of the first and second electrodes being coupled to a reference voltage.

10. The sensor of claim 9, wherein the control circuitry is configured to supply a signal at a frequency of at least about 4 MHz.

11. The sensor of claim 10, wherein the control circuitry is configured to supply a signal at a frequency of at least about 8 MHz.

12. The sensor of claim 1, further comprising control circuitry coupled to one of the first and second electrodes and configured to detect a change in a capacitance of the sensor.

13. The sensor of claim 1, further comprising at least one alarm responsive to an output signal of the sensor.

14. The sensor of claim 1, wherein the first and second electrodes are horizontally spaced.

15. (Canceled)

16. The sensor of claim 1, wherein the first and second electrodes are arranged for placement on a wall of the container.

17. The sensor of claim 16, further comprising a mounting structure to which the first and second electrodes are affixed.

18. The sensor of claim 17, wherein the mounting structure is a thin, electrically insulative film.

19. The sensor of claim 18, wherein the thin, electrically insulative film is Mylar.

20. The sensor of claim 1, wherein the first and second electrodes are placed within the wall of the container.

21. A method for detecting a level of a viscous fluid within a container having an interior volume, comprising:

placing a capacitive structure including mutually cooperative, mutually electrically isolated, first, upper, and second, lower electrodes on a wall of the container in isolation from the interior volume of the container, wherein each electrode exhibits a two-dimensional area having a vertical dimension and a horizontal dimension and wherein the first and second electrodes are arranged in mutually proximity such that at least a majority of each of their respective areas are both vertically and horizontally offset from each other;

driving the capacitive structure with an oscillating signal at a frequency of more than about 1 MHz and generating an output signal from the capacitive structure responsive thereto;

decreasing a fluid level within the container at a rate sufficient to leave a residual film of the viscous fluid on an interior surface of the wall above the level of the viscous fluid and at least proximate a lower edge of the first, upper electrode; and

rapidly detecting a change in the output signal responsive to the decreasing of the fluid level.

22. The method of claim 21, wherein placing the capacitive structure on a wall of the container comprises placing the capacitive structure within the wall of the container.

23. The method of claim 21, wherein driving the capacitive structure with an oscillating signal at a frequency of more than about 1 MHz further comprises driving the capacitive structure at a frequency of at least about 4 MHz.

24. The method of claim 21, wherein driving the capacitive structure with an oscillating signal at a frequency of more than about 1 MHz further comprises driving the capacitive structure at a frequency of at least about 8 MHz.

25. The method of claim 21, wherein placing the capacitive structure on a wall of the container comprises forming the capacitive structure on a mounting structure and affixing the mounting structure to an exterior wall of the container with adhesive.

26. The method of claim 21, wherein placing the capacitive structure on a wall of the container comprises forming the capacitive structure on the wall.

27. The sensor of claim 21, further comprising determining whether the output signal exceeds a reference signal.

28. The method of claim 27, further comprising initiating at least one alarm if the output signal exceeds the reference signal.

29. The method of claim 28, wherein the at least one alarm is at least one of an audible alarm and a visual alarm.